

# Abstract

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number  
**WO 2004/014551 A2**

(51) International Patent Classification<sup>7</sup>: **B01J 31/16**,  
31/18, C07B 53/00, C07C 29/136, 211/10, 251/02, 209/42,  
5/02, C07B 37/04, C07D 301/03, 301/19, 301/32, 203/06,  
C07B 37/12, C07C 247/06

(74) Agents: **GIBSON, Sara, Hillary, Margaret et al.**; John-  
son Matthey Catalysts, Intellectual Property Dept., P.O. Box  
1, Belasis Avenue, Billingham, Cleveland TS23 1LB (GB).

(21) International Application Number:  
PCT/GB2003/003306

(22) International Filing Date: 30 July 2003 (30.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0218675.7 12 August 2002 (12.08.2002) GB

(71) Applicant (for all designated States except US): **JOHN-  
SON MATTHEY PLC** [GB/GB]; 2-4 Cockspur Street,  
Trafalgar Square, London SW1Y 5BQ (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HEMS, William,**  
**Patrick** [GB/GB]; 2 Whitehouse Gardens, Poringland,  
Norwich, Norfolk NR14 7RG (GB). **XIAO, Jianliang**  
[CA/GB]; 16 Castletown Close, Liverpool L16 3GJ (GB).  
**CHEN, Weiping** [CN/GB]; 36 Baldwin Avenue, Liver-  
pool L16 3GB (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,  
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

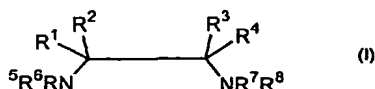
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished  
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: NITROGEN-CONTAINING LIGANDS



(57) **Abstract:** An immobilised nitrogen-containing ligand is described comprising the reaction product of a compound of formula (I) wherein R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup> and R<sup>8</sup> are independently hydrogen, a saturated or unsaturated C1-C10 alkyl group, an aryl group, a urethane group, a sulphonyl group or form an imine group, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> are independently hydrogen, a saturated or unsaturated C1-C10 alkyl group or an aryl group and at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is functionalised with a functional group, and a solid support having a site capable of reacting with said functional group. The nitrogen-containing ligand is useful for preparing immobilised catalysts for performing e.g. asymmetric catalysis.

WO 2004/014551 A2